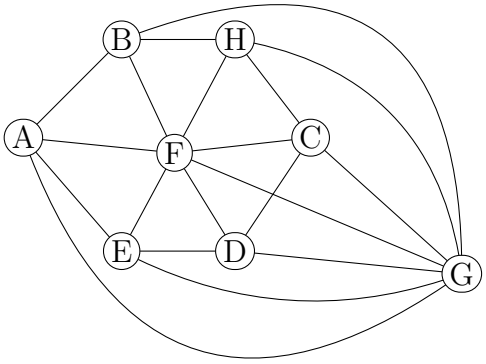
CS 173, Fall 2014
Examlet 7, Part B

NETID:

FIRST: **LAST:**

Discussion: Thursday 2 3 4 5 Friday 9 10 11 12 1 2

1. (9 points) What is the chromatic number of graph G (below)? Justify your answer.



2. (6 points) Check the (single) box that best characterizes each item.

$\sum_{k=1}^{n} \frac{1}{2^k}$ $1-(\frac{1}{2})^{n-1}$ ☐ $2-(\frac{1}{2})^{n}$ ☐ $1-(\frac{1}{2})^{n}$ ☐ $2-(\frac{1}{2})^{n-1}$ ☐

Putting 10 people in the canoe caused it to sink. 10 is _____ on how many people the canoe can carry.

an upper bound ☐ a lower bound ☐

neither ☐

The chromatic number of a graph with maximum vertex degree D

$= D$ ☐ $= D+1$ ☐

$\geq D+1$ ☐ $\leq D+1$ ☐

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1. (11 points) Let's define two sets as follows:

$$A = \{x \in \mathbb{R} \ : \ |x+1| \leq 2\}$$
$$B = \{w \in \mathbb{R} \ : \ w^2 + 2w - 3 \leq 0\}$$

Prove that $A = B$ by proving two subset inclusions.

2. (4 points) Check the (single) box that best characterizes each item.

$\sum_{k=3}^{n} k^7 =$ $\sum_{p=1}^{n-2} p^9$ ☐ $\sum_{p=1}^{n-2} k^7$ ☐ $\sum_{p=1}^{n-2} k^9$ ☐ $\sum_{p=1}^{n-2} (p+2)^7$ ☐

The chromatic number of C_n. 2 ☐ 3 ☐ ≤ 3 ☐ ≤ 4 ☐

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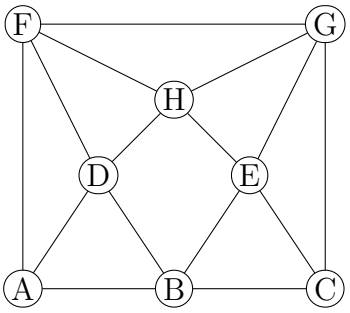
1. (9 points) What is the chromatic number of graph G (below)? Justify your answer.



2. (6 points) Check the (single) box that best characterizes each item.

All elements of X are also elements of M. $M = X$ ☐ $M \subseteq X$ ☐ $X \subseteq M$ ☐

W_7 is a subgraph of G. 4 is ____ the chromatic number of G. exactly ☐ a lower bound on ☐ an upper bound on ☐

Chromatic number of G $\mathcal{C}(G)$ ☐ $\phi(G)$ ☐ $\chi(G)$ ☐ $\| G \|$ ☐

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1. (11 points) Let's define two sets as follows:

$$A = \{(p+1, p) \ : \ p \in \mathbb{R}\}$$
$$B = \{\lambda(1,0) + (1-\lambda)(2,1) \ : \ \lambda \in \mathbb{R}\}$$

Prove that $A = B$ by proving two subset inclusions.

2. (4 points) Check the (single) box that best characterizes each item.

Suppose I want to estimate $\frac{103}{20}$. 3 is ____	an upper bound ☐	a lower bound ☐	neither ☐				
Chromatic number of a bipartite graph with at least one edge	1 ☐	2 ☐	3 ☐	can't tell ☐			

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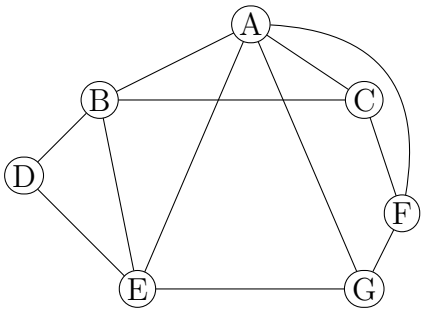

2. (6 points) Check the (single) box that best characterizes each item.

I found 143 identical marbles in my saucepan last Saturday. 143 is ____ how many marbles this size will fits in my saucepan.

exactly ☐ a lower bound on ☐ an upper bound on ☐

$\sum_{i=1}^{p-1} i =$ $\frac{p(p-1)}{2}$ ☐ $\frac{(p-1)^2}{2}$ ☐ $\frac{p(p+1)}{2}$ ☐ $\frac{(p-1)(p+1)}{2}$ ☐

The chromatic number of a graph with maximum vertex degree D

$= D$ ☐ $= D+1$ ☐ $\leq D+1$ ☐ $\geq D+1$ ☐

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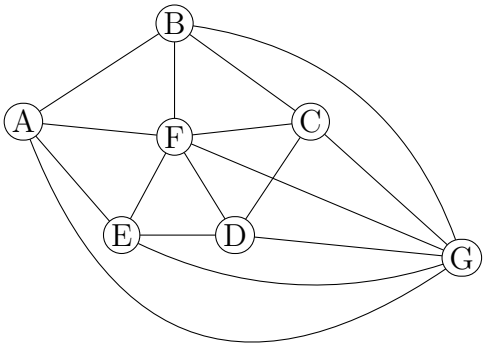
1. (9 points) What is the chromatic number of graph G (below)? Justify your answer.



2. (6 points) Check the (single) box that best characterizes each item.

Exactly 11 Xboxes fit in my suitcase by volume, but I haven't checked their total weight. 11 is _____ on how many Xboxes the suitcase can hold.

an upper bound ☐ a lower bound ☐ neither ☐

All elements of M are also elements of X.

$M = X$ ☐ $M \subseteq X$ ☐ $X \subseteq M$ ☐

$\sum_{k=1}^{n-1} \frac{1}{2^k}$

$1 - (\frac{1}{2})^n$ ☐ $2 - (\frac{1}{2})^n$ ☐ $1 - (\frac{1}{2})^{n-1}$ ☐ $2 - (\frac{1}{2})^{n-1}$ ☐